



Ergonomics

Real People

Real Problems

Real Solutions
for under \$100

Packaging Problems Fixed

Conveyer Diverts Back Pain

❖ **Problem:** Packers pick up shrink-wrapped clothing items from a conveyor—reaching across to the far side of the conveyor to retrieve them—and place the clothing in boxes in front of them.

✓ **Solution:** Installing a diverter arm on the conveyor to deliver items to the side of the packagers alleviated the workers' back pain resulting from the constant flexing at the waist when retrieving the wrapped items.

Cost: Less than \$20 for parts and labor

Really Turning It Around

❖ **Problem:** Workers pack items into rectangular boxes, positioned so they must reach repeatedly across the long axis of the boxes, exposing their backs, shoulders, and arms to stress.

✓ **Solution:** Rotating the boxes allows workers to reach across the shorter axis of the box, reducing the length of reach and the risk of injury.

Cost: Nothing

The Tall and Short of It

❖ **Problem:** Some packaging line workers experience lower back and upper extremity discomfort because all workstations are the same height.

✓ **Solution:** The company installs adjustable workstands to accommodate workers of different heights.

Cost: \$98 per worker

Footrests Fight Fatigue

❖ **Problem:** Packaging plant workers complain of leg and back fatigue.

✓ **Solution:** Management installs footrests for standing posture workstations.

Cost: \$50 per worker

Diverting Repetitive Reach Disorders

❖ **Problem:** Many companies with packaging departments find the standard width of conveyor belts forces workers to repeatedly reach across the belt to obtain small items.

✓ **Solution:** To reduce repetitive reach and the risk of back, shoulder, and arm disorders, some companies mount a simple diverter above the belt to slide the items closer to the workers.

Cost: Less than \$50

Two Solutions Are Better Than One

❖ **Problem:** One company recognized the need to make two changes in their packaging line workstations as workers developed musculoskeletal disorders.

✓ **Solution A:** Adding a belt conveyor to move packaged boxes away from the workstation reduced back and shoulder stress because employees no longer carried each box to a pallet area.

Cost: \$90.50 per worker

✓ **Solution B:** Adding a conveyor section with an automatic case sealer lessened handling and alleviated upper body stress.

Cost: \$70.83 per worker

Food Processing Fixes

A Perfect Fit

■ **Problem:** Employees in a poultry processing plant complained that ill-fitting protective gloves do not provide adequate protection.

✓ **Solution:** The poultry processing company bought workers protective gloves from several manufacturers to provide a wide range of sizes for better fit.

○ **Cost:** Negligible

Rush Hour

■ **Problem:** In a grocery warehouse, order pickers use pallet movers to gather items on a computerized “pick list.” There’s always congestion near popular sale items, resulting in lost-time for the order pickers. To make up that time, workers rush through the rest of their orders, which can produce collisions. Injuries result from both equipment collisions and the rush to lift heavy items.

✓ **Solution:** Designating a special location for sale items and spacing it to allow access by more than one order picker at a time solved the problem.

○ **Cost:** Essentially none—with the added benefit of increasing productivity and reducing damage to equipment

■ **Problem:** In the same grocery warehouse, congestion in the order-filling area during workers’ shift changes caused significant delays in production.

✓ **Solution:** Staggering order pickers’ starting times eased the congestion in the area and kept work flowing.

○ **Cost:** Nothing!

Manufacturing Makeovers

Moving and Modifying in Manufacturing

❖ **Problem:** At a manufacturing quality control station, a worker visually inspects small parts. Rejected parts are dropped through a chute into a large box on the floor under the conveyor. The box is hard to remove and very heavy when full.

✓ **Solution:** Move the box to a chair next to the conveyor, modify the chute, and eliminate the low lifts.

Cost: Under \$50

Simpler and Safer

❖ **Problem:** In many mechanical assembly companies, the use of hand tools injures small parts of workers' hands.

✓ **Solution:** Pad tools with inexpensive available materials, such as pieces of hose, tubing, tape, or packaging materials to reduce injury.

Cost: Next to nothing

Softening the Blow

❖ **Problem:** A common complaint among many manual assembly companies is that contact force injures workers' forearms, tendons, nerves, and other soft tissue.

✓ **Solution:** Pad the sharp edges of assembly benches with foam pipe insulation to reduce contact force.

Cost: Pennies

An Uplifting Solution

❖ **Problem:** At a glass ceramic cooktop plant, workers manually lift uncut plates of glass onto a waist-high conveyor belt, where it is then stacked vertically on a nearby L-shaped holder. A forklift handles the strapped holder carrying the glass. The holder, however, presents the glass at knee-height, making workers bend each time to pick up the glass.

✓ **Solution:** The workers devised a stand made from a wooden shipping crate and placed it beneath the L-holder to raise the glass to waist height.

Cost: A little labor

Dust Buster?

❖ **Problem:** At the same glass ceramic cooktop plant, workers who off-load the cut glass on a felt-covered air table must be sure there are no small pieces of glass remaining to scratch the next sheet. Because the table is 10 feet x 10 feet, workers had to climb on the table to clean it and then reach in all directions to clear it off.

✓ **Solution:** Workers took a small hand-held vacuum cleaner and attached a length of plastic pipe to the vacuum with hose clamps. The pipe helped workers push the vacuum cleaner around the tabletop.

Cost: Approximately \$10

Raising the Chute

❖ **Problem:** At a plastics plant, parts leaving the injection-molding machine dropped onto a long chute and into a box on the floor. Workers then picked up full boxes.

✓ **Solution:** To reduce low-level lifting, the company modified the chutes on some machines to drop the parts into boxes set atop other empty boxes. To reduce the weight of the boxes, other workstations substitute smaller boxes, which are emptied frequently.

Cost: Essentially nothing

Tool-Time

❖ **Problem:** At a manual assembly plant, a worker installs a small part with needle-nosed pliers that put stress on the wrist.

✓ **Solution:** The supervisor suggested another tool—available in the tool crib—that would make the task easier and safer.

Cost: Nothing

The Cutting Edge

❖ **Problem:** A trailer manufacturing company wanted a better method for cutting the tubing that protects hydraulic hoses from abrasion. The current tool required workers to use repetitive, heavy force to operate.

✓ **Solution:** Initially, the company provided utility knives with sharper blades. Then, it purchased pliers-like shears specifically designed for the task.

Cost: Under \$100

Exercising a Unique Idea

❖ **Problem:** At a graphite fibers plant, technicians who re-string fibers through ovens, baths, and winders often find they must kneel or lie on platforms to separate and sort fibers.

✓ **Solution:** To alleviate worker knee pain, the company purchased exercise mats for each low-stringing location.

Cost: \$20 per employee

A Sticky Fix

❖ **Problem:** It's difficult to keep small micro-electronic components stationary to work on or solder, putting stress on workers' wrists, hands, and fingers.

✓ **Solution:** To create flexible positioning for soldering, microelectronic components are pressed into dollops of a "silly putty"-like substance atop raised wooden blocks.

Cost: Minimal

The "Switch"-aroo

❖ **Problem:** A crane operator in an aluminum smelting facility used a joystick control with a 1/4-inch diameter knob to prepare electrodes for removal from baking. As a result of repetitive joystick "jogging," the operator developed carpal tunnel syndrome from resting the palm of his hand atop the tiny joystick knob.

✓ **Solution:** Initially, a joystick knob with a diameter six times larger replaced the old 1/4-inch knob. When servicing the crane again, the employer replaced the joystick with a switch.

Cost: Less than \$10

Reaching New Heights

❖ **Problem:** In an electronics assembly company, the controls of a large, fixed-height machine feeding electronic components to automatic, circuit-board assembly machines were too high for small-statured workers. To operate these controls, shorter employees had to reach over their heads and then could only apply awkward and insufficient force.

✓ **Solution:** The company built a removable plywood platform to raise affected workers so that they could operate the controls without physical stress.

Cost: Minimal

Medical Solutions

Lowering the Bar

❖ **Problem:** Laboratory workers hanging solution bags on a 75-inch-high rack experienced shoulder discomfort. To reach the rack and change the bags, some workers had to stand on their toes.

✓ **Solution:** Cutting 6 inches from the bottom and rewelding the rack.

Cost: Less than \$40 per rack

A Microscopic View

❖ **Problem:** Routine use of standard microscopes strains the neck and shoulders.

✓ **Solution:** Many medical products companies place small blocks below the backends of microscope bases. This minor adjustment tilts the scopes, providing a more comfortable viewing posture and reducing neck and shoulder discomfort.

Cost: Inconsequential

Getting a Handle on the Problem

❖ **Problem:** Technicians in a production laboratory must move constantly from one lab to another while holding containers and carrying lab apparatus. The round doorknobs make entry and exit difficult, and the resulting hundreds of wrist rotations per day produce wrist and hand stress.

✓ **Solution:** The company replaced the round doorknobs with handles that need only be pushed down to open doors.

Cost: Approximately \$9.15 per worker

Ups and Downs

❖ **Problem:** Pharmaceutical company employees lifted bottles of two different weights and sizes from a tall cart to a fixed-height tabletop to unwrap and pass into a sterile area for filling. Employees removed bagged bottles from the top of the cart. They also had to lift rigid packs of bottles from the bottom of the cart. Employees began experiencing shoulder pain from lifting with their hands above head height to remove the bottles from atop the cart to place on the lower fixed-height tabletop.

✓ **Solution:** To eliminate the employees' hazardous and unnecessary reaching and stretching motions, the employer modified the tabletop by lowering half of it 12 inches to accommodate placement of the bottles from the bottom of the cart. The other half of the tabletop was raised to the level of the top of the cart.

Cost: About \$50 per employee

Get a Grip!

❖ **Problem:** Pharmaceutical technicians hand-tighten dozens of vaccine jug lids daily. If not adequately tightened, the jugs could leak and spoil products worth thousands of dollars. Testing revealed, however, that most operators are poor judges of cap torque—resulting in significant unwarranted hand and wrist stress. Operators also were marginally capable of using the proper torque required to tighten the caps adequately.

✓ **Solution:** The company purchased a dial torque wrench, made a special cap torque attachment, and trained the technicians to use the new equipment.

Cost: About \$8 per worker

Keep a Lid on It

❖ **Problem:** Technicians at a medical products company use large numbers of sterile syringes packaged in hard plastic sleeves with protective caps that need to be broken off for use. Breaking the protective caps causes severe discomfort to workers' hands and wrists.

✓ **Solution:** The company's ergonomics team developed and installed a wall-mounted cap opener.

Cost: Under \$100

Unsinking Sinks Stops Stress

❖ **Problem:** In a medical products laboratory, the sinks to wash parts and tools are so deep that technicians must extend their reach and bend forward.

✓ **Solution:** To lessen the workers' bodily stress, the company placed a raised platform of stainless steel wire mesh at the bottom of each sink, creating an elevated false bottom and reducing reaching and bending. To accommodate larger objects, the platform can be removed.

Cost: Under \$50

Grab Bag Gallery

A Novel Solution

■ **Problem:** A book warehouse sorter receives a bin of books on a gravity conveyor, carries it to the sorting station to scan each book's bar code and then places it in the correct order bin. Upon completing the batch, the sorter slides the bin onto the evacuation conveyor. Because each filled bin weighs between 30 and 50 pounds, the sorter complained of back pain and fatigue.

✓ **Solution:** The company connected the three sections of the conveyor and installed manual stops between sections to avoid backup.

Cost: \$80, including labor

Mouse Problems

■ **Problem:** Customer service representatives using their computers to research customer queries work in cubicles with fixed-height work surfaces. Some employees complain of wrist pain, particularly in the "mouse" hand.

✓ **Solution:** The company installed an adjustable-height keyboard and mouse tray that sits atop the desk and lowers into position.

Cost: \$40 per employee (retail)

Arm Them with Knowledge

■ **Problem:** Employees in many different offices experience pain from their daily tasks.

✓ **Solution:** Train workers to properly use the adjustments already provided in their chairs, computer monitor, and furniture systems. Changes in the placement of telephones, printers, and in-boxes can lead to better working posture. In addition, training and encouraging employees to take micro-breaks helps overused body parts rest and recuperate.

Cost: Nothing!